

CLAIMS

1. A method of preparing a purified cell population comprising stem cells for introducing into a patient, comprising:
 - (a) obtaining adipose tissue from said patient;
 - (b) processing said adipose tissue to separate cells therein from other tissue components; and
 - (c) purifying the separated cells from other tissue components;wherein said method does not include isolating stem cells from other purified cells, thereby preparing a purified cell population comprising adipose tissue-derived stem cells.
2. The method of claim 1, wherein said purified cell population further comprises one or more cells selected from the group consisting of: red blood cells, white blood cells, fibroblasts, fibroblast-like cells, neutrophils, monocyte/macrophages, and basophils.
3. The method of claim 1, wherein said purified cell population further comprises one or more tissue components selected from the group consisting of: extracellular matrix polypeptides or fragments thereof, proteoglycans, cytokines, and growth factors.
4. The method of claim 3, wherein said extracellular matrix polypeptide is selected from the group consisting of: collagen, thrombospondin, fibronectin, vitronectin, cytotactin, laminin and integrins.
5. The method of claim 1, further comprising suspending said purified cells in a physiologically compatible buffer.

6. The method of claim 5, further comprising placing said purified cells in a syringe.

7. The method of claim 1, further comprising freezing said isolated cells in freezing medium.

8. The method of claim 1, wherein said processing comprises one or more procedures selected from the group consisting of:

- (a) mincing the adipose tissue;
- (b) treating the adipose tissue with an enzyme that facilitates the release of cells from other tissue components;
- (c) exposing the adipose tissue to ultrasonic energy; and
- (d) treating the adipose tissue with perfluorocarbons.

9. The method of claim 8, wherein said enzyme treatment is performed at a temperature below 28°C.

10. The method of claim 8, wherein said enzyme treatment is performed at a pH below 7.0.

11. The method of claim 1, wherein said patient is a human.

12. The method of claim 1, wherein said patient is a non-human animal.

13. The method of claim 12, wherein said animal is a horse or camel.

14. The method of claim 12, wherein said animal is a dog or cat.

15. The method of claim 12, wherein said animal is an exotic or zoological animal.
16. The method of claim 15, wherein said animal is a hoofed mammal.
17. The method of claim 15, wherein said animal is a bird.
18. The method of claim 12, wherein said animal is a livestock or farm animal.
19. The method of claim 18, wherein said animal is a cow or goat.
20. The method of claim 12, 13, 16 or 18, wherein said adipose tissue is obtained from the tail head region of the animal.
21. A method of preparing a composition comprising purified adipose tissue-derived stem cells for introducing into an animal, comprising:
 - (a) obtaining adipose tissue from the tail head region of said animal;
 - (b) processing said adipose tissue to separate cells therein from other tissue components; and
 - (c) purifying the separated cells from other tissue components, thereby preparing a composition comprising purified adipose tissue-derived stem cells.
22. The method of claim 21, wherein said composition further comprises one or more cells selected from the group consisting of: red blood

cells, white blood cells, fibroblasts, fibroblast-like cells, neutrophils, monocyte/macrophages, and basophils.

23. The method of claim 21, wherein said composition further comprises one or more tissue components selected from the group consisting of: extracellular matrix polypeptides or fragments thereof, proteoglycans, cytokines, and growth factors.

24. The method of claim 23, wherein said extracellular matrix polypeptide is selected from the group consisting of: collagen, thrombospondin, fibronectin, vitronectin, cytotactin, laminin and integrins.

25. The method of claim 21, further comprising suspending said separated cells in a physiologically compatible buffer.

26. The method of claim 25, further comprising placing said purified cells in a syringe.

27. The method of claim 21, further comprising freezing said isolated cells in freezing medium.

28. The method of claim 21, wherein said patient is selected from the group consisting of: horse and camel.

29. The method of claim 21, wherein said processing comprises one or more procedures selected from the group consisting of:

- (a) mincing the adipose tissue;
- (b) treating the adipose tissue with an enzyme that facilitates the release of cells from other tissue components;
- (c) exposing the adipose tissue to ultrasonic energy; and

(d) treating the adipose tissue with perfluorocarbons.

30. The method of claim 29, wherein said enzyme treatment is performed at a temperature below 28°C.

31. The method of claim 29, wherein said enzyme treatment is performed at a pH below 7.0.

32. A method of providing a composition comprising purified stem cells for introducing into a patient, comprising:

- (a) processing collagen-based tissue obtained from a patient to separate cells therein from other tissue components;
- (b) purifying the separated cells; and
- (c) placing said separated cells in a container, thereby providing a composition comprising purified stem cells.

33. The method of claim 32, further comprising suspending said separated cells in a physiologically compatible solution.

34. The method of claim 32, further comprising shipping said composition to a physician or veterinarian.

35. The method of claim 32, wherein said container is a syringe.

36. The method of claim 32, further comprising freezing or lyophilizing said separated cells.

37. The method of claim 32, wherein said collagen-based tissue is adipose tissue or umbilical cord matrix.

38. The method of claim 32, wherein said method does not include isolating stem cells from other purified cells.

39. The method of claim 32, wherein said purified cell population further comprises one or more cells selected from the group consisting of: red blood cells, white blood cells, fibroblasts, fibroblast-like cells, neutrophils, monocyte/macrophages, and basophils.

40. The method of claim 32, wherein said purified cell population further comprises one or more tissue components selected from the group consisting of: extracellular matrix polypeptides or fragments thereof, proteoglycans, cytokines, and growth factors.

41. The method of claim 40, wherein said extracellular matrix polypeptide is selected from the group consisting of: collagen, thrombospondin, fibronectin, vitronectin, cytotactin, laminin and integrins.

42. The method of claim 32, wherein said processing comprises one or more procedures selected from the group consisting of:

- (a) mincing the tissue;
- (b) treating the tissue with an enzyme that facilitates the release of cells from other tissue components;
- (c) exposing the tissue to ultrasonic energy; and
- (d) treating the tissue with perfluorocarbons.

43. The method of claim 42, wherein said enzyme treatment is performed at a temperature below 28°C.

44. The method of claim 42, wherein said enzyme treatment is performed at a pH below 7.0.

45. The method of claim 32, wherein said patient is a human.
46. The method of claim 32, wherein said patient is a non-human animal.
47. The method of claim 46, wherein said collagen-based tissue is obtained from the tail head region of the animal.
48. A kit useful in the treatment of an injury or disease in an animal, comprising: a container comprising a composition comprising a stem cell population purified from a collagen-based tissue obtained from an animal.
49. The kit of claim 48, wherein said injury is a musculo-skeletal tissue injury.
50. The kit of claim 48, wherein said stem cell population is present in a physiologically compatible solution.
51. The kit of claim 48, wherein said container is a syringe.
52. The kit of claim 48, wherein said container is a cryovial.
53. The kit of claim 48, wherein said composition is frozen.
54. The kit of claim 48, wherein said composition is lyophilized.
55. The kit of claim 48, wherein said collagen-based tissue was obtained from the animal to be treated.

56. The kit of claim 48, wherein said composition further comprises one or more cells selected from the group consisting of: red blood cells, white blood cells, fibroblasts, fibroblast-like cells, neutrophils, monocyte/macrophages, and basophils.

57. The kit of claim 48, wherein said composition further comprises one or more tissue components selected from the group consisting of: extracellular matrix polypeptides or fragments thereof, proteoglycans, cytokines, and growth factors.

58. The kit of claim 57, wherein said extracellular matrix polypeptide is selected from the group consisting of: collagen, thrombospondin, fibronectin, vitronectin, cytotactin, laminin and integrins.

59. The kit of claim 48, wherein said collagen-based tissue is adipose tissue obtained from the tail head region of the animal.

60. The kit of claim 48, wherein said tissue is selected from the group consisting of: tendon, ligament, cartilage, and bone.

61. The kit of claim 48, wherein said tissue is selected from the group consisting of: lung tissue, blood vessels, liver, nerve, and heart.

62. The kit of claim 48, wherein said tissue is hoof laminae.

63. The kit of claim 48, wherein said kit comprises two or more containers, each comprising a composition comprising a stem cell population purified from a collagen-based tissue obtained from an animal.

64. A kit useful in the prevention of an injury in an animal, comprising: a container comprising a composition comprising a stem cell population purified from a collagen-based tissue obtained from an animal.

65. The kit of claim 64, wherein said injury is a musculo-skeletal tissue injury.

66. The kit of claim 64, wherein said stem cell population is present in a physiologically compatible solution.

67. The kit of claim 64, wherein said container is a syringe.

68. The kit of claim 64, wherein said container is a cryovial.

69. The kit of claim 64, wherein said composition is frozen.

70. The kit of claim 64, wherein said composition is lyophilized.

71. The kit of claim 64, wherein said collagen-based tissue was obtained from the animal to be treated.

72. The kit of claim 64, wherein said composition further comprises one or more cells selected from the group consisting of: red blood cells, white blood cells, fibroblasts, fibroblast-like cells, neutrophils, monocyte/macrophages, and basophils.

73. The kit of claim 64, wherein said composition further comprises one or more tissue components selected from the group consisting of: extracellular matrix polypeptides or fragments thereof, proteoglycans, cytokines, and growth factors.

74. The kit of claim 73, wherein said extracellular matrix polypeptide is selected from the group consisting of: collagen, thrombospondin, fibronectin, vitronectin, cytotactin, laminin and integrins.

75. The kit of claim 64, wherein said collagen-based tissue is adipose tissue obtained from the tail head region of the animal.

76. The kit of claim 64, wherein said tissue is selected from the group consisting of: tendon, ligament, cartilage, and bone.

77. The kit of claim 64, wherein said tissue is selected from the group consisting of: lung tissue, blood vessels, liver, nerve, and heart.

78. The kit of claim 64, wherein said tissue is hoof laminae.

79. The kit of claim 64, wherein said kit comprises two or more containers, each comprising a composition comprising a stem cell population purified from a collagen-based tissue obtained from an animal.

80. A method of preparing a purified cell population comprising collagen-based tissue-derived stem cells for delivery to a patient, comprising:

- (a) obtaining collagen-based tissue from said patient;
- (b) processing said collagen-based tissue to separate cells therein from other tissue components; and
- (c) purifying the separated cells,

wherein said processing comprises contacting said collagen-based tissue with a series of screens, thereby preparing a purified cell population comprising collagen-based tissue-derived stem cells.

81. The method of claim 80, wherein said processing further comprises treating the tissue with an enzyme that facilitates the release of cells from other tissue components.

82. The method of claim 80, wherein said purified cell population further comprises one or more cells selected from the group consisting of: red blood cells, white blood cells, fibroblasts, fibroblast-like cells, neutrophils, monocyte/macrophages, and basophils.

83. The method of claim 80, wherein said purified cell population further comprises one or more tissue components selected from the group consisting of: extracellular matrix polypeptides or fragments thereof, proteoglycans, cytokines, and growth factors.

84. The method of claim 83, wherein said extracellular matrix polypeptide is selected from the group consisting of: collagen, thrombospondin, fibronectin, vitronectin, cytotactin, laminin and integrins.

85. The method of claim 80, further comprising suspending said purified cells in a physiologically compatible buffer.

86. The method of claim 85, further comprising placing said purified cells in a syringe.

87. The method of claim 80, further comprising freezing said isolated cells in freezing medium.

88. The method of claim 80, wherein said processing comprises one or more procedures selected from the group consisting of:

(b) exposing the tissue to ultrasonic energy; and

(b) treating the tissue with perfluorocarbons.

89. The method of claim 81, wherein said enzyme treatment is performed at a temperature below 28°C.

90. The method of claim 81, wherein said enzyme treatment is performed at a pH below 7.0.

91. The method of claim 80, wherein said patient is a human.

92. The method of claim 80, wherein said patient is a non-human animal.

93. The method of claim 80, wherein said patient is a horse or camel.

94. The method of claim 80, wherein said patient is a cat or dog.

95. The method of claim 92, wherein said tissue is obtained from the tail head region of the animal.

96. A method of preparing a purified cell population comprising collagen-based tissue-derived stem cells for providing to a patient, comprising:

- (a) obtaining collagen-based tissue from said patient; and
- (b) processing said collagen-based tissue to isolate cells therein from other tissue components,

wherein said processing comprises contacting the tissue with a surface to which the tissue adheres, thereby preparing a purified cell population comprising collagen-based tissue-derived stem cells.

97. The method of claim 96, wherein said contacting comprises mixing the tissue with particles of the adherent surface.

98. The method of claim 96, wherein said processing further comprises mincing said tissue.

99. The method of claim 98, wherein said processing further comprises treating the tissue with an enzyme that facilitates the release of cells from other tissue components.

100. The method of claim 96, wherein said surface is selected from the group consisting of: Velcro, polystyrene, glass fiber, glass wool, cellulose, and ceramic.

101. The method of claim 96, wherein said purified cell population further comprises one or more cells selected from the group consisting of: red blood cells, white blood cells, fibroblasts, fibroblast-like cells, neutrophils, monocyte/macrophages, and basophils.

102. The method of claim 96, wherein said purified cell population further comprises one or more tissue components selected from the group consisting of: extracellular matrix polypeptides or fragments thereof, proteoglycans, cytokines, and growth factors.

103. The method of claim 102, wherein said extracellular matrix polypeptide is selected from the group consisting of: collagen, thrombospondin, fibronectin vitronectin, cytotactin, laminin and integrins.

104. The method of claim 96, further comprising suspending said purified cells in a physiologically compatible buffer.

105. The method of claim 104, further comprising placing said purified cells in a syringe.

106. The method of claim 96, further comprising freezing said isolated cells in freezing medium.

107. The method of claim 99, wherein said enzyme treatment is performed at a temperature below 28°C.

108. The method of claim 99, wherein said enzyme treatment is performed at a pH below 7.0.

109. The method of claim 96, wherein said patient is a human.

110. The method of claim 96, wherein said patient is a non-human animal.

111. The method of claim 110, wherein said animal is a horse or camel.

112. The method of claim 110, wherein said animal is a dog or cat.

113. The method of claim 110, wherein said adipose tissue is obtained from the tail head region of the animal.

114. A device adapted for preparing a cell population comprising collagen-based tissue-derived stem cells, comprising a series of mesh screens, arrayed such that one or more of the screens may be separated from each other while in contact with a collagen-based tissue sample.

115. The device of claim 114, wherein said screens comprise edges capable of cutting an adipose tissue sample.

116. The device of claim 114, further comprising a cutting implement that may be inserted between adjacent screens.

117. The device of claim 114, further comprising a container comprising said mesh screens.

118. The device of claim 117, wherein said container comprises an opening through which a collagen-based tissue sample may be placed into said container.

119. A method of treating an injury or disease in a patient, comprising providing to said patient an isolated cell population or composition comprising collagen-based tissue-derived stem cells prepared according to a method of any one of claims 1, 21, 32, 80, or 96.

120. The method of claim 119, wherein said injury or disease is a musculo-skeletal injury or disease.

121. The method of claim 119, wherein said isolated cell population or composition is provided directly to a site of injury or disease.

122. The method of claim 119, wherein said isolated cell population or composition is provided by injection.

123. The method of claim 119, wherein said isolated cell population or composition is provided to the bloodstream of said patient.

124. The method of claim 119, wherein said isolated cell population or composition is provided intravenously or inter-arterially.

125. The method of claim 119, wherein said tissue is selected from the group consisting of: tendon, ligament, cartilage, and bone.

126. The method of claim 119, wherein said tissue is hoof laminae.

127. The method of claim 119, wherein said tissue is selected from the group consisting of: lung, blood vessels, liver, nerve, and heart.

128. The method of claim 119, wherein said injury is selected from the group consisting of: sprain, strain, dislocation, bruising, tear, and fracture.

129. The method of claim 119, wherein said injury or disease is an ischemic injury or disease.

130. The method of claim 119, wherein said injury or disease is a septic injury or disease.

131. The method of claim 119, wherein said patient is a human.

132. The method of claim 119, wherein said patient is a non-human animal.

133. The method of claim 119, wherein said animal is a horse or camel.

134. The method of claim 119, wherein said animal is a dog or cat.

135. A method of preventing an injury in a patient, comprising providing to said patient an isolated cell population or composition comprising collagen-based tissue-derived stem cells prepared according to a method of any one of claims 1, 21, 32, 80, or 96.

136. The method of claim 135, wherein said injury is a musculo-skeletal injury.

137. The method of claim 135, wherein said isolated cell population or composition is provided directly to a site of potential injury.

138. The method of claim 135, wherein said isolated cell population or composition is provided by injection.

139. The method of claim 135, wherein said isolated cell population or composition is provided to the bloodstream of said patient.

140. The method of claim 135, wherein said isolated cell population or composition is provided intravenously or inter-arterially.

141. The method of claim 135, wherein said tissue is selected from the group consisting of: tendon, ligament, cartilage, and bone.

142. The method of claim 135, wherein said tissue is hoof laminae.

143. The method of claim 135, wherein said tissue is selected from the group consisting of: lung, blood vessels, liver, nerve, and heart.

144. The method of claim 135, wherein said injury is selected from the group consisting of: sprain, strain, dislocation, bruising, tear, and fracture.

145. The method of claim 135, wherein said injury or disease is an ischemic injury or disease.

146. The method of claim 135, wherein said injury or disease is a septic injury or disease.

147. The method of claim 135, wherein said patient is a human.

148. The method of claim 135, wherein said patient is a non-human animal.

149. The method of claim 135, wherein said animal is a horse or camel.

150. The method of claim 135, wherein said animal is a dog or cat.